

PUBLIC HEALTH ACT,

(11 & 12 Vict., Cap. 63.)

R E P O R T

TO THE

GENERAL BOARD OF HEALTH,

ON A

PRELIMINARY INQUIRY

INTO THE SEWERAGE, DRAINAGE, AND SUPPLY OF
WATER, AND THE SANITARY CONDITION
OF THE INHABITANTS

OF THE PARISH OF

A L F R E T O N,

IN THE COUNTY OF DERBY.

BY WILLIAM LEE, Esq., C.E.,

SUPERINTENDING INSPECTOR.



LONDON:

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1850.

NOTIFICATION.

THE General Board of Health hereby give notice, in terms of section 9th of the Public Health Act, that on or before the 24th of September next, being a period of not less than one month from the date of the publication and deposit hereof, written statements may be forwarded to the Board with respect to any matter contained in or omitted from the accompanying Report on the Sewerage, Drainage, and Supply of Water, and the Sanitary Condition of the Parish of ALFRETON, or with respect to any amendment to be proposed therein.

By order of the Board,

HENRY AUSTIN, *Secretary.*

*Gwydyr House, Whitehall,
8th August, 1850.*


ALFRETON



Boundary of Parish.....

Proposed Boundary.....

Scale, 2 Inches to 1 Mile.



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PUBLIC HEALTH ACT (11 and 12 Vict., Cap. 63).

Report to the General Board of Health on a Preliminary Inquiry into the Sewerage, Drainage, and Supply of Water, and the Sanitary Condition of the Inhabitants of the Parish of ALFRETON, in the County of Derby. By WILLIAM LEE, Esq., C.E., Superintending Inspector.

REPORT.

WHEREAS, in pursuance of the Public Health Act (1848), the General Board of Health, appointed for the purposes of that Act, have, upon the petition of not less than one-tenth of the inhabitants rated to the relief of the poor of and within the parish of Alfreton, in the county of Derby (the numbers of the said petitioners greatly exceeding 30 in the whole), directed William Lee, a Superintending Inspector appointed for the purposes of the said Act, to visit the said parish, and to make public inquiry, and to examine witnesses, as to the sewerage, drainage, and supply of water, the state of the burial grounds, the number and sanitary condition of the inhabitants, and as to any Local Acts of Parliament in force within such parish for paving, lighting, cleansing, watching, regulating, supplying with water, or improving the said parish, or having relation to the purposes of the said Act; also as to the natural drainage areas, and the existing parochial or other local boundaries, and the boundaries which might be most advantageously adopted for the purposes of the said Act:

Now I, the said William Lee, having previously given the notices required by the said Act, proceeded upon the said inquiry in the manner directed by the said Act; and do report in writing to the said General Board upon the several matters with respect to which I was directed to inquire as aforesaid, and upon certain other matters with respect to which I deem it expedient to report for the purposes of the said Act, as follows:—

Gwydyr House, 11th June 1850.

MY LORDS AND GENTLEMEN,

I PROCEEDED with the inquiry into the sanitary condition of Alfreton on the 10th day of December last, at the George Hotel there, and explained the provisions of the Public Health Act, and the manner in which it would affect the parish and town; after which I made a careful inspection of the parish. I was accompanied in this part of my duty by the Rev. J. R. Errington, curate; Capt. John Holmes; George Wilson, Esq.; Gervase C. Hall, Esq., solicitor; Mr. Joseph Walters, draper; Mr. William Hill, acting surveyor of highways; and Mr. John Wilson, timber dealer.

On reaching Riddings, which was formed into an independent ecclesiastical district in 1835, an objection was taken by James Oakes, Esq., J.P., that notices of the inquiry had not been affixed upon the doors of St. James's Church, although the district is within the parish of Alfreton; and as it appeared that there had been a similar omission with respect to several licensed places of worship at Swanwick and Somercotes, I felt it my duty to bring the inquiry to a termination, in order that the requirements of the Act of Parliament should be complied with.

On the 18th day of January the inquiry was reopened at the same place as before; and Mr. Stephen Shirt proved that notices had been duly affixed upon the doors of all the places of worship, and other places where public notices were usually affixed in the whole parish.

DESCRIPTION.—ALFRETON is a market town and parish in the Union of Belper, hundred of Scarsdale, north division of the county of Derby. It comprises the township of Alfreton, the ville of Greenhill-lane, the manor of Riddings with Ironville, and the hamlets of Somercotes, Birchwood, and Swanwick.

The town is situated on the brow of a hill, and consists of only a few streets, with a market-place in the centre. William Palmer Morewood, Esq., is lord of the manor of Alfreton, and also the patron and impropiator of the living. He and Gervase Cressy Hall, Esq., solicitor, are the owners of the greater part of the cottage property in the town, and are both petitioners for the application of the Public Health Act.

I shall have to show hereinafter that the town has been grievously afflicted with epidemic fever, arising from preventible causes, and therefore the inhabitants will owe a deep debt of gratitude to George Bansall, Esq., and the Rev. J. R. Errington, who originated the present proceedings, and also to Mr. Morewood and Mr. Cressy Hall, for the good feeling with which they have come forward to assist in improving the condition of the place.

The principal avocations of the inhabitants are in connexion with the collieries and iron works; framework knitting affords employment to about 60 families; and the remainder are occupied chiefly in agricultural pursuits.

There is no Local Act of Parliament in force within the parish of Alfreton for paving, lighting, cleansing, watching, regulating, supplying with water, or improving the same, or having relation to the purposes of the Public Health Act.

There is a small scale plan of the parish, but it is not suitable for sanitary purposes. Captain Holmes says in his evidence—

“Except the small survey which you have seen, I believe there is no plan or survey of the parish or township of Alfreton. It is in the custody of Mr. William Wilson, but I am not aware in what capacity he holds it. I should say that it ought to be in the custody of the churchwardens.”

CONTOUR, GEOLOGY, METEOROLOGY, &c.—The surface of the whole parish is very undulating, and, therefore, highly favourable to the discharge of surface water.

The greater part of the town stands on the ridge of a hill that forms the most elevated land within a distance of several miles. Two of the principal streets, Church-street and the Nottingham-road, are situated on this ridge; the former extends westwardly from the market-place, and the latter eastwardly, where the ground rises and trends towards the south, so as to give a considerable area suitable for collecting water at an altitude above the level of the houses. The turnpike road from Chesterfield to Derby runs from north to south through the town, and forms the two other principal streets, which fall rapidly each way from the market-place, northwardly to the Alfreton Brook, which constitutes the boundary of the parish, and southwardly to a brook which passes by Hockley towards Oakerthorpe.

The parish is an extensive one, and, with the exception of the town, the houses are very much scattered, so that, with such a contour, combined and systematic sanitary works for the whole parish would be impossible.

The geological strata of the district is that of the coal-measures; and there are extensive collieries and iron-works in the parish. The soil is chiefly clay, and not of a very fertile character.

No meteorological observations have been kept in the district. The prevalent wind is westerly; and I should estimate the annual rainfall at not less than 32 inches minimum, with an occasional fall of more than 40 inches in the year.

POPULATION, AND RATE OF INCREASE, NUMBER AND CLASSIFICATION OF HOUSES.—At the census of 1801 the population of the parish was 2,301; in 1811 it was 3,396; in 1821, 4,689; in 1831, 5,691; and in 1841 it had reached 7,577. I have been unable to ascertain the present number, but it may probably not be less than 9,000.

The rate of increase from 1801 to 1811 was 47·5 per cent.; from 1811 to 1821, 38·0 per cent.; from 1821 to 1831, 21·3 per cent.; and from 1831 to 1841, 33·1 per cent. This rapid increase is to be attributed to the wealth of the mines in the parish, combined with improved means of locomotion and transit. The same changes, however, that have improved the parish generally have greatly decreased the prosperity of the town. It was formerly a considerable posting town; but since the North Midland Railway was opened, the whole of the through traffic has been diverted, and the population of the town has increased very little, if at all. The present population of the town is said not to exceed 2,000.

In 1831 the number of houses in the parish was 1,109, but in 1841 they had increased to 1,498; the increase in the 10 years

being at the rate of 35 per cent. I have been unable to ascertain the present number of houses; but it appears, from the following return by Mr. Francis Bradley, that only a small proportion of them is rated to the relief of the poor. If the increase since the last census has been as rapid as it was during the preceding 10 years, the present number of houses in the whole parish would be not less than 1,972. It seems, however, that only 610 are rated, and in the township not more than 197.

If the great bulk of the houses are excused from the payment of poor-rates, they are also free from highway-rates, &c.; and I think it a serious question for the consideration of the *rate-payers*, whether there is any real charity in the exemption, or whether the practical effect is not that a great number of the householders become semi-paupers, while those who have to bear the whole of the local burdens are compelled to pay proportionately less for labour.

If to any extent this return is affected by the practice of rating houses along with land or other buildings, I feel bound to say that the system is a bad one; because, for purposes of comparison, for important statistical deductions, and even for the purpose of complying with the law, each tenement or building ought to be separately distinguished in the rate-books of the parish or township respectively.

The following is a classification of the annual rateable value of the houses at present rated in the parish and in the township:—

RATING.		In the Parish.	In the Township.
£.	£.		
3 and under	4 .	424	84
4	5 .	47	26
5	6 .	26	10
6	7 .	16	9
7	8 .	12	7
8	9 .	6	3
9	10 .	8	6
10	15 .	42	40
15	20 .	22	6
20	25 .	4	4
25	30 .	..	..
30	40 .	..	1
40	50 .	2	..
50	60 .	1	..
60	70 .	..	..
70	80 .	..	..
80	90 .	..	..
90	100 .	..	..
100 and upwards	.	..	1
Total	. .	610	197

(Signed)

FRANCIS BRADLEY,
Assistant Overseer.

DISEASE AND MORTALITY.—While making an inspection of the town I met with many instances of disease clearly traceable to the absence of any arrangements for securing health. Nearly the whole of these were, however, so connected with the want of water, that I think it better to reserve any quotations from my minutes, made on the spot, until a subsequent part of this report. I shall confine myself, under the present head, to the evidence given during the inquiry, and to several documents illustrating the nature of the special disease with which Alfreton has been recently visited.

The town had been occasionally attacked with fever in past years, but in the month of August, 1849, a low typhoid fever broke out, which for its malignity, and the proportionate number of fatal cases, can only be compared with some of the worst localities where cholera was at the same time making such dreadful havoc; while in the long continuance both of the epidemic generally and the duration of each particular case, its disastrous effects far exceed those produced by cholera.

It is a remarkable circumstance, and one to which I would direct the special attention of your honourable Board, that Alfreton was entirely exempted from *cholera pestilentia*. There were cases of diarrhoea in the parish, and solitary instances of cholera within a few miles; but in Alfreton this fever appears to have occupied the place of cholera, and to have been produced by, and dependent upon the same general and local causes as the more prevalent epidemic.

From the very able report prepared by George Oldham, Esq., one of the resident surgeons, I have been led to consider the possible connexion of this fever with the Asiatic cholera, and submit, with great deference, that such a connexion not only exists, but also, that there is an apparent relation between this disease and epidemic influenza.

In the Alfreton fever, death did not take place from coma; but, as the disease proceeded, it appears to have assumed one or other of two classes of symptoms, and in some instances both, in the fatal cases. These symptoms were either bronchial, analogous to those of lapsed influenza; or abdominal, with yellowish thin evacuations, and frequently hæmorrhage from the mucous membranes of the bowels, with exhaustion of the system, as in some of the more protracted cases of cholera, and especially in dysentery.

It is only necessary, before proceeding with the evidence, that I should advert to a statement which obtained some credence in the town, that this fever had been imported from Demerara. I do not think there is the slightest ground for such an opinion. From the report of Mr. Oldham, and the communications thereon from Drs. Watson and Budd, the two fevers appear to have been perfectly distinct, and dissimilar. The young man who had returned from Demerara did not communicate disease to any other person; and I am bound to add, from my own examination, not only

that there exist in the town of Alfreton local causes quite sufficient to account for even a greater degree of sickness than the inhabitants have endured, but also that I have met with fevers of similar character elsewhere.

Mr. Oldham says, in his evidence—

“I have been practising as a surgeon in Alfreton 13 or 14 years. We have had measles and scarlet fever here, and sometimes cases of low continued fever, in one instance of very severe character. I think that was three years ago. The late epidemic fever broke out in the beginning of August last. It has been very prevalent. I have had 70 cases myself, and, I believe, Mr. Spencer about the same number. If it were stated that there had been 170 cases, I should not doubt the fact. It has been a continued fever running into typhus, and is indigenous to the place. I am quite sure that it was not imported into the town. A young man came from Demerara, and had a yellow form of intermittent fever, which gave way under quinine, and the usual remedies for that complaint. Persons who have had typhoid fever are a long time, frequently, before they become convalescent; so that it is a disease which entails a considerable expense upon the heads of families affected. I put in an essay on the fever, which I wrote, and also Dr. Watson’s reply.* I fully concur in the opinions expressed by him, both as to the nature of the disease and its immediate causes. I cannot doubt that a system of perfect drainage would improve the health of the town. The worst cases of fever I ever saw in the town, *before the present epidemic*, were in the neighbourhood of the open ditch at the lower end of the town. There were catch-pits there to impound the solid refuse. I certainly farmed them for some time, but I am not aware that they could be then any worse than if any other person had farmed them, and I was anxious at that time for their removal, and offered to certify that they were injurious nuisances. They were removed some months before the epidemic broke out. They did not, to any extent, affect the present epidemic. The water in Alfreton is, on the whole, very deficient in quantity and impure in quality. It contains salts of iron. A great deal of the spring-water contains mineral matter in solution, no mechanical filtration will separate that. My well has been sunk considerably deeper without the water being improved. There can be no perfect drainage without abundance of water. It must be poured in at every inlet at which animal or vegetable matter is admitted. The purposes of a water supply are *five*. First, for human consumption; secondly, for culinary purposes; thirdly, for ablutions, for all of which it ought to be as pure as possible; fourthly, for cleansing the streets; and fifthly, for cleansing the drains. Pure water would answer for all these purposes. As a matter of health and comfort, a supply of water given with a tap in the house, would be much preferable to having to fetch and carry it. If the inhabitants of Alfreton could have a supply of pure water constantly on, with a tap in every house, at a price not exceeding 2*d.* per week per house, it would be a great advantage as compared with their present condition. The town of Alfreton is capable of great improvement in its sanitary condition.”

* See Appendix.

Mr. Thomas Parsons said—

“I reside in New-street, and have lived there $3\frac{1}{2}$ years. My house is 12*l.* rent. I am a manufacturer of frames for stocking-weaving. We have 10 of family, including myself, wife, six children grown up, and two apprentices. The fever entered my house on the 2nd of August last, and has not left us yet. Every one in the house has had it. I expect a large bill from the doctor, and the loss to me in money will not be less than 70*l.*, besides all the suffering, trouble, anxiety, and loss of time. We were three months and could not attend to business, my works were entirely shut up for five weeks. I should be glad to pay 10*s.* per annum if I could get a good supply of water; we have none but what we beg and buy. I have given a shilling a barrel of 60 gallons, and I have given even 1*s.* 6*d.* per barrel. It now occupies a boy that I have the greater portion of his time to fetch water, and clean shoes and knives, and such like little jobs. The drainage is also very bad. We have a drain under the house-floor, and frequently perceive unpleasant smells from it. I lived at the bottom end of the town previously. There has also been fever there. During the time I lived there we have had to manage with one bucket of water per day for cooking, cleansing, &c., because it was so scarce. We and our neighbours were compelled to stint ourselves to that quantity. The inhabitants do so now at the same place, in the summer-time. My family have about an average degree of constitutional strength, not sickly nor very stout. If there were more water and better drainage, we should have better health. I know that the Public Health Act would give us such advantages.”

Mr. George Coates said—

“I am a printer, residing on the Nottingham-road. I am the owner of the property I occupy. My house would let for between 12*l.* and 13*l.* per annum. We have no water but what we get from the town pump. The distance will be from 150 to 200 yards. I hire a young man to fetch water for us. He very often fetches four cans-full per day about the size of a bucket. He is paid for it. I suppose I get it at about the same price as Mr. Parsons. The article regulates itself by the supply and demand. We have a filter for rain-water, but after filtration it still tastes of soot. I think it is as good as the town pump. We catch the rain by spouts and a cistern. I constructed the cistern, but have forgotten the cost. We have to clean the cistern out about twice a-year. In a dry season, when the cistern is getting low, the water becomes very disagreeable; that is generally in the summer time. Pure fresh water is then more desirable than at any other time. The filterer cost 5*s.* 6*d.*, I have had it perhaps two years; it has not wanted any repairs during that time. The cans often require repairing, and are soon worn out; the ironstone water corrodes them very rapidly.”

Mr. Parsons said that cans holding three gallons cost 2*s.*; they would be worn out in a year and a half. A little repair would be needed in that time, perhaps 6*d.* each; but the water is of such a nature that, if it comes to stand, it corrodes the tin all up the sides.

Mr. Coates resumed—

“One of my daughters has had the fever, during the year just ended. She was ill five or six weeks, but recovered; she had to keep her bed a fortnight. As a parent I was in great trouble, and should have been glad to have adopted anything that would have prevented it from spreading further, or coming again. I continue in that opinion now. I have three daughters residing with me, and one son sleeps in the house. My daughters are aged 28, 22, and 17, and my son 20. We have an underground drain from the cellar, running into the main drain of the town. We used formerly to smell a very disagreeable stench when the wind was in the south, but I have not smelt it lately. I should be very thankful for a good supply of water, and very willing to pay liberally for it.”

The Rev. J. R. Errington said—

“I have been rather more than three years curate in charge of the parish of Alfreton. During that time my pastoral duties have brought me much into contact with the inhabitants, and especially the poor. There has been a very malignant fever prevalent in the town, and it has spread to Greenhill-lane, Birchwood, a few eases in Riddings, and about five eases in Swanwick. It has also reached the adjoining parishes of Tibshelf, Blackwell, and Shirland. There were about 170 eases in the town altogether, and 11 deaths certain from the fever. I find that the framework knitters, of whom there are 60 families, are generally in want of water, drainage, and ventilation. Their occupations are sedentary, and therefore good air and good water are all the more essential to them. They are decidedly below par in their morals. We have about 350 yards of open drain or ditch, and in the lower part of the town all the drainage and refuse that is removed flows along a ditch for a distance of 230 to 250 yards. It is not now so bad as it used to be when there were catches to detain the solid refuse, but still it is very offensive and destructive to the health of the inhabitants near and upon it. The public drains are inadequate where any exist, and without public drains there can be no private drainage. Ever since I came here we have had eases of typhus fever, and one or two deaths before the present epidemic. I am of opinion that the application of the Public Health Act to the township of Alfreton is very desirable, but I think it ought not to extend to the whole parish. There would be great difficulty in working it, because the inhabitants are opposed. They are scattered, and the improvements would be expensive.”

Mr. Pym, the superintendent registrar of the Belper Union, was unable to make a return of the mortality for the township of Alfreton in the form which I have usually adopted, but Mr. Errington has extracted from the burial register the number of inhabitants interred, with the ages at death. From this it appears that in 1846 there were 31 deaths, at an average age of 28 years and 3 months, comprising 13 males averaging 35 years and 6 months, and 18 females averaging 23 years and 7 months.

In 1847 there were 29 deaths, at an average age of 49 years and 11 months. These consisted of 17 males at an average age

of 53 years and 4 months, and 12 females averaging 45 years and 2 months.

In 1848 the deaths were 28 in number, averaging 37 years and 9 months, being 12 males at an average of 33 years and 9 months, and 16 females at an average of 40 years and 9 months.

In 1849 the deaths amounted to 41, the ages averaging 35 years and 6 months. Of these 20 were males, who died at an average age of 40 years, and 21 females at an average of 31 years and 3 months. At a later period of the inquiry, Mr. Errington gave me some information as to the sick societies in the town:—

“I think there are five or six men’s and two women’s sick societies in the town, including the Odd Fellows and secret orders. I should think that the greater part of the heads of families among the lower classes are members of those established for males. Only two of them are enrolled, and they all meet at public-houses. The last year has seriously affected these societies.”

Mr. John Rolley, parish clerk, said, on the same subject—

“The oldest sick society in the town has been long established. The second was founded as early as 1785. The older societies pay a contribution of 1s. 6d. per month, and receive 6s. as full pay for six months, and halfpay for six months longer, and then 2s. during the remainder of sickness or inability to work. If the members have belonged to the society two years, 6l. funeral money is paid. * The older societies are not prospering. I cannot tell the condition of those more recently established.”

The disastrous consequences of the fever in Alfreton have not only been felt in the families that have suffered, but in the whole town. The trade of the place has been greatly depressed in consequence. I was informed that for some time few persons would attend the market there; strangers were deterred from visiting the town, and the saleshops infected were without customers for weeks together. There cannot be a doubt that the effects of this calamity will be long felt by the town of Alfreton, or that, without such remedial works as they have no power at present to construct, the inhabitants are liable at all times to this or any other malignant and fatal disease.

LAND DRAINAGE AND MANURES.—I received some evidence on this point from William Wilson, Esq., who says—

“I am agent to W. P. Morewood, Esq., the lord of the manor. There is a general sort of understanding between him and his tenant farmers, that when they choose to drain any of their land he will find tiles and they will find labour. The common horse-shoe tiles are used, with phalanges at the bottom to prevent them sinking into the earth. Soles are not used at all here. Mr. Morewood has a yard for manufacturing tiles. In some tender parts of the ground a stone slate is used to put the tiles on. The price of tiles is 21s. per thousand. They are of the usual length of a foot. A great deal of the land is clay subsoil, and it is much improved by draining. I have not formed

an estimate of the improved value to the tenant from drainage. I cannot give you an idea as to the extent to which this drainage has gone, but more than half the land through the parish would be improved if it were drained. There has been more drainage done in the township than in the outskirts of the parish. I should not think that half the land in the township requires draining."

George Wilson, Esq., said—

"I have drained 40 acres of land, 20 inches to 24 inches deep, with tiles, using flat stones as soles where necessary. Some of it has been done 20 years. It is acting well now, with the exception of a small piece. The width between the drains is from 15 to 18 feet. I have found the land very much increased in fertility since it was drained. In some instances the water has been conveyed into lodges for the use of the cattle. As it runs from the drains the water is very bright and pure. I would put in the drains at a greater depth if I could do so with facility.

"I have used liquid manure upon drained land, chiefly upon pasture. It is equal to solid manure. The refuse of the town has not been applied, except that from the lodges that formerly existed at the bottom of the town."

DRAINAGE OF THE TOWN.—I find it difficult, especially in a small town like Alfreton, to set out its condition as to drainage, water supply, and disease, so that the one shall be distinct and separate from the other. Where the products of unremoved, decomposed, animal and vegetable matter are such as to produce epidemic fever in a small community, the action is generally so intense, and so intimately connected with its causes, that they hardly admit of separate consideration. I have scarcely met with a town in England where the arrangements for water are so bad. In the words of one of the witnesses, "without water there can be no drainage;" and where the refuse of the houses is not properly removed, there *must* be preventible disease and death. Almost every statement, therefore, mixes up these three great questions of water, drainage, and disease. I am thus compelled in treating of each to allude to the other two, and, under separate heads of my report, can only distinguish where one appears more prominently on my minutes than the rest.

In the course of the inspection, Mr. Errington pointed out a grate on the Shirland-road emitting a bad stench, and stated that it had been worse since the gas-work were established. On the Nottingham-road, near Henry Green's cottage, there is a drain from the road southward into a field below. It is 12 inches square and 2 feet deep. In one place it is made deeper to take a cellar drain, but none of the other houses have any drains; the floors of several are damp, and I found the privies very foul.

At Mr. John Briddon's property, the tenant, Brecknall, says—

“The drainage and foul water stands in front of the house. I have had to carry as much as 15 buckets from my house in a morning, and we are always in danger of its coming in. There is a pump in the back yard, but the water is hard. It is not usable for many purposes. I fetch water from my mother’s, a few doors off, sometimes three or four gallons a-day. We are badly off for water, and it would be a good thing if the sough could be altered, if not we cannot stay. The house is always damp.”

Mr. Matthew Bradley is the owner and occupier of the Traveller’s Inn, and says—

“There is a well in the premises to dry the property, and I laded out about 2,000 gallons last Monday, and about 400 gallons this morning. In the winter time it takes about half my time to lade the water out. My property has cellars. Good drainage and good water would be a great advantage to me and my tenants too. The drain is stopped up by an adjoining owner.”

I examined the premises occupied by Mr. Parsons, and mentioned by him in his evidence, and found quite sufficient causes for the disease with which every member of his large family has been afflicted.

Mr. Rolley, the parish clerk, lost his wife and daughter by the fever, and I found, adjoining his house, a yard in a very filthy state, with a large quantity of manure both liquid and solid.

There have been two or three cases of fever at Mr. George Wregglesworth’s. The house has no water or drainage.

The surface of the Royal Oak yard is very bad; the privies are foul, and it contains two pigsties, but has no drainage. Nesbitrow consists of 20 houses, with very bad drainage. Thomas Willgoose is the occupant of one, and says—

“I pay 5*l.* rent, and have two low rooms and two chambers. The drain is stopped up and frequently flows over the door stones.”

I examined the open ditch, at present the only channel for all the refuse of the town. It is very foul, emitting large quantities of sulphuretted hydrogen gas, and an intolerable stench. Mr. John Wilson lives near it, and said, that only the week previously his family were obliged to go to the other end of the house.

Jonathan Burnham is tenant of a cottage belonging to Mr. Morewood, near this ditch. The privies empty into it, and I have never seen anything more horrible. There has been sickness in the house.

In two other small thatched cottages, close to the same ditch, there have been four cases of fever. One of the tenants said—

“In a dry time the drain is bad and makes us ill.”

Thomas Wragg says—

“The drain is very bad, and I was ill last summer but one. We had to lade water out of the house. The drain is quite close to the house. We have good water in the draw-well, but after rain it is muddy.”

John Johnson says—

“We have a well that we sank ourselves, and the water does for slopping. We fetch for food from the pump above. We have a bad privy. The drain goes close behind the house.”

The same drain runs close past the house occupied by George Pearson, and his daughter and two sons had fever three years ago.

I also examined the back premises of the Butcher's Arms kept by Mr. Samuel Webster, and found the ditch within 7 feet of the house, and quite stagnant. He complained of the foul smell and said—

“We have no water, and the place is in fact, a cesspool. I began five weeks ago last Friday of the fever, and am likely to be five weeks longer. One of my children has begun of the fever to-day.”

Mr. John Smedley, postmaster, has had the fever in his house and has a sough under the house floor.

Mr. Jones, tailor, complained that the drainage was very bad; that it was only one brick high, and during the last summer the effluvium from it was dreadful.

I might enumerate other instances, but these will be sufficient to prove to the Board that from the inspection of the town the drainage is very bad. I shall quote very briefly from the evidence on this part of the subject. Mr. Joseph Walters said—

“I am a linen-draper in Alfreton, and have lived here 35 years. I am well acquainted with the condition of the town. There are no public water-works in Alfreton. There are several underground drains: I do not know their depth. The public drain at the market-place is not deeper than 4 feet, but at my cellar it is perhaps 2½ yards. I had to drain my premises about eight years ago, and had then to continue it about 60 or 70 yards distance; 20 yards would have been sufficient had not the drain been stopped up. It cost me perhaps, using the same materials, 25s. or 30s.; I do not know the cost of excavating, nor how much it would be per yard, and yet I have been making estimates for the cost of draining and supplying Alfreton with water.* If you were to say that the work would cost at least 5*l.*, it would be incorrect, the extreme would be 25s. for the whole 60 or 70 yards. There was a public sewer existing there before, which I believe was made by the surveyor of the highways. It was partially stopped, so that water occasionally came into my premises; the water that came into my cellar came from the street sewer. I supposed it to be so, and caused the sewer to be opened; it was found partially stopped, and the expense of opening it was paid out of my own pocket. The drains are *not* open ditches in a considerable portion of the town; there are some *few* just in the outskirts, more especially at the bottom of the town. I do not know whether the public drain running down Chapel-street is an open ditch or not, nor whether New-street has an open drain or not; I believe if it has one it is covered. I do not

* It is necessary to explain that Mr. Walters, draper, was much opposed to the application of the Public Health Act.

know whether the drain behind the houses at the lower part of the town is open or not.* I do not know whether there are any privies that empty into it or not. After crossing the road there would be one-third the length of the town southward, an open ditch. I have known that in an offensive condition; it is so every summer. There have been cases of fever on its margin, but I think a greater proportion of cases in other parts of the town. A very small portion of the drainage in the town is by open ditches.† I do not know whether it would not be better for them to remain open than to cover them. There used to be lodges for the accumulation of the town manure, but they are now done away with. The solid refuse was taken out and conveyed to the land."

Nothing further will be needed from those acquainted with the locality than an attentive perusal of this evidence, in order to produce a conviction of the necessity for those arrangements which it is the object of the Public Health Act to provide.

PRESENT SUPPLY OF WATER.—I have already stated that the supply of water is deplorably bad. I now proceed to a few quotations from my minutes while inspecting the town.

At Mr. Joseph Haynes's property on the Nottingham road, Samuel Jephson's wife said—

"There has been fever here. We have no drain from any of the houses. There is a well with a pump for six houses; the pump is at times dry in summer, and we go then to Mr. Wilson's and to Captain Holmes's for water, say 200 yards. We fetch about a dozen buckets per day; we have no other water. Last summer the well was dry about three months; we got, perhaps, a canfull of water in a week from it."

Another part of the same property has a draw-well without windlass, for eight houses. The tenants have about 60 feet to carry the water, and say it is too hard for washing and becomes yellow in summer, that foul vessels are dipped, that the privies are near to it, and also manure heaps, and that there is no drainage whatever. The water in the well of adjoining property I found quite brown, with a drain and a manure heap near it.

Mr. John Summers has a draw-well at his property occupied by Widow Freeman, from whence the water is said to be about the best in Alfreton. I found it brown in colour with some flocculent matter, and unfit for food.

Mrs. Hannah Vardy said—

"I and my son and daughter have all had fever. We have to fetch all our water above 100 yards, and often a quarter of a mile. We beg it. There is no drain but the open channel in front of the door."

George Green is a tenant to Mr. Coates. His wife has had the

* This is the open ditch, the condition of which, and its fearful consequences, I have so recently described.

† See the Rev. J. R. Errington's evidence, *ante*, p. 12.

fever, and he has a drain passing under the house-floor. His landlord and he are both anxious for water. He says—

—“We have no water on the premises; we have to go on trespass for it. If we want health we must have water.”

Mr. Henry Walters, druggist, has recently had his well deepened at a cost of 6*l.* or 7*l.* The water at the time of my visit was slightly discoloured and contained flaky matter. Mr. W. says they do not use it for food, but fetch from his brother's, 50 yards distant.

There were two or three cases of fever in the house of Mr. George Wregglesworth, fronting the street. He has neither water nor drainage.

At the Nag's Head I was informed that they fetch water for brewing, three-quarters of a mile. There is a draw-well on the premises, and after a flood they have water for about three weeks, and then are without again until another flood comes. Mr. William Wragg, the landlord, had had the fever 18 weeks previously, and had only been able to get out about a month before my visit.

At Mr. Samuel Bland's property, John Stirland was just recovering from a bad attack of the fever. I found the drainage and privies bad. A new well had been recently sunk and a pump put down at a cost of 40*l.*, but the water is so hard that it cannot be used for washing. There are pigsties and privies within a few yards.

Near the gas-yard there are three houses without water, and all of them have had fever. The surface is foul and undrained.

Mr. Joseph England says that the town pump has been dry in summer for months together; that yeast-grounds and other refuse comes in, and that horses will not drink it.

At the property of Mr. Samuel Clee and others, the well to supply 13 houses fails every year, and was dry four months last summer.

Below these are some dilapidated cottages with no water but what they fetch from a well on the opposite side of the road, and it is not of good quality. There have been two cases of fever there.

In Nesbit-row there is one pump for 12 houses, but in a very dry season it entirely fails. One of the tenants says—

“The water is never good, and we are obliged to look it up because at times so many people flock to it who have no water.”

Mr. Charles Thirkill, saddler, says—

“We have no water to the house, we fetch it from the town-pump or any place where we can get it. We have a well in the cellar that has water when there is plenty elsewhere; we can only use it for slopping. We catch rain-water from the roof at the back. Nearly all the neighbours above and below are as bad off for water as we are. I hope we shall be mended by the Public Health Act.”

Mr. Jones, tailor, complains similarly—

“Last summer we had to beg water wherever we could. We have no supply but the town pump; it has a red sediment at the bottom; our kettle is quite incrustated.”

Mr. John Shepherd said that the water at the town-pump had a yellowish scum on the top as well as a sediment at the bottom. They have no other water except rain-water.

I also examined Mr. Joseph Walters' water supply for his own house, which in his opinion was so good as to render the Public Health Act perfectly unnecessary for the parish of Alfreton. I am quite ready to admit that there is no better pump-water in the town, but this is saying very little, where pure water is almost unknown. I prefer, however, giving the description in the words of Mrs. Walters, who said—

“The pump in the yard and also the force-pump were put down before we came to the premises. We have cisterns for both hard and soft water at the top of the house. We have rain-water reservoirs under each kitchen, and a pump in each. The soft-water cistern was cleaned out a short time before we came, three years ago. In a dry summer the soft-water falls short and then we are obliged to use the pump-water for washing. We do not use the pump-water for that purpose when we have any rain-water. *We give water to almost every one who comes, and in a dry season they come all the way from the bottom of the town. At all times a considerable number comes here to beg water, but the MOST IN SUMMER.*”

Mr. D. Bowen, Mr. Samuel Coates, and Mr. W. Pickburn, all keeping front shops, have plenty of water but of bad quality. It has to be filtered, and if it stands five or six hours there is a sediment in it.

George Wilson, Esq., says—

“I am VERY WELL SUPPLIED WITH WATER on my premises—quite plentifully supplied. I have a pump in the yard; sometimes it is not so good as at other times, but it always answers for certain purposes, *except for cooking food and washing of linen: we never use it for washing of linen.* The pump has never been dry these 30 years, and during times of scarcity of water in the town it has been fetched from my pump by some of the inhabitants of Chapel-street, eastward, and below the Post-office, southward. We get water for washing of linen from a lead cistern; that is rain-water collected from the roof. We get it from my brother's pump on the other side of the street for food when it is necessary. My servants sometimes get water from the well in the vicarage croft. The times when we fetch the water from my brother's for food is when our pump-water is not good. We have no pumps in the house. The cistern-water is conveyed into the kitchen by pipe, and we have a tap over the sinkstone. Generally speaking, there is a sufficient quantity of water in the cistern, but I cannot say that it has not been run dry. We generally clean it out twice a year. We have no other water in the house but that. I have no filter. I have no doubt that with a filter, the pump-water would be good. The

well is about 12 yards deep. I have paid no attention to chemistry. I do not know whether or not it would discolour linen if filtered. My sister says that many people who fetch it, use it for washing linen. *I have no doubt that when water is scarce, they are glad to use any that they can get. Some people fetch water from my pump at all seasons of the year.*"

The Rev. J. R. Errington says, on this point—

"In summer time water is sold. Much of the water used is of very indifferent quality, and for washing purposes inapplicable. The want of water is felt not only in summer, but even now, when there has been no rain for a month. Some persons have to pay from 2*d.* to 5*d.* per week for water. I feel quite certain that the poor would be very willing to pay for a good supply of water if it did not exceed 1*d.* per week for the poorest inhabitant."

I need not add more to show that whatever might be the condition of a single family in the town as to water, the inhabitants generally, and the poor in particular, could scarcely be in a state of greater destitution, taking into consideration the quantity and quality of this necessary of life, and the difficulty of obtaining it.

INSURANCE, FIRES, AND MEANS OF EXTINGUISHING.—I believe that a good deal of the property in the town is insured, but on my inquiring of Captain Holmes he said—

"We have no fire engine. If a fire were to break out the town would be entirely at its mercy."

VENTILATION.—The principal street north and south is for the greater part wide and open, and it cannot be said of any of the principal thoroughfares that they are closely built. The court yards are almost entirely open backward to the country, and there are but few houses that do not admit of thorough ventilation. The construction of some of the cottages is very defective, and some are in a dilapidated state. One of the greatest evils connected with this part of the subject is the small size of some of the bed-rooms used by the poor, in proportion to the number of occupants.

The lodging-houses are here, as elsewhere, a pest to society. Mr. Errington said, in his evidence—

"There are five or six lodging-houses in the town for tramps and vagrants. There was a case of fever in one of them, but it was not fatal. I have had occasionally to visit some of them, and have found them in a very bad state as to cleanliness of the persons, the rooms, beds, and bedding. I was never there at night, but know that the accommodation is very bad. The charge is 2*d.* per night for a grown-up person, and less for children. I have not seen any arrangements for the separation of the sexes. About harvest time and the fairs there is a great number of tramps in the town. I should think it very desirable for them to be placed under proper regulations as to comfort and cleanliness, and so as to avoid immorality."

CONDITION OF THE ROADS.—The carriage-ways of the town-ship are chiefly repaired by turnpike trustees, and the footways

by the surveyors of highways. Mr. John Wharton is the surveyor, and made me the following return—

“How and by whom were you elected surveyor of the highways?—
By the township.

“How many years have you had the office?—Five years.

“What is the total length of highways repaired by the inhabitants?—
One mile and a-half of double causeway, and top drains in the town, three miles.

“Length of private roads in the parish?—Two miles of single causeway.

“Length of turnpike-road repaired by trustees?—About four miles.

“The average amount in the pound of rate levied?—Five pence.

“Total amount of one rate?—60*l.* 12*s.*

“What is the state of the roads?—In good repair.

“What kind of material is used?—Cinders and limestone for the carriage-ways, and pit stone for foot pavings.

“From whence are the materials obtained, what is the distance and the cost per ton?—Eight miles distance and 9*s.* per ton.

“What is the average annual income for three years?—128*l.*

“What is the average annual expenditure for three years?—128*l.*

“What is the length of the public drains?—None.

“Describe their form?—Common square soughs.

“Are there any plans showing their situations?—No.

“Are there any sections showing their inclinations?—No.

“Description of street grates used, and their number?—Metal.

“Are any of them trapped?—No.

(Signed)

“JOHN WHARTON,

“*Surveyor for the Township.*”

From the above it will be seen that the management of the highways is anything but efficient, and also that, considering the very limited liability of the township, the cost of the highways is capable of considerable reduction, by more comprehensive arrangements.

STATE OF THE BURIAL GROUNDS.—The area of the church-yard is 3 roods and 20 perches, or 4,235 yards, of which the church occupies 558 yards, leaving 3,677 yards available for burials. If the graves were all dug close together, so that no room should be lost, the area would suffice for 1,576 graves; but that is by no means the case. The ground, being an ancient one, has not been set out systematically; and there are unoccupied spaces. There have been 1,281 interments within the last 20 years, and, when it is considered that some family graves must have been opened several times during that period, there can be no doubt that the ground is in an inconveniently crowded condition. I found on inquiry and inspection that the graves on the south side are only three feet deep, because there is stone at that depth. On the north side there is a stiff clay, and the graves there have frequently water at three feet deep. The quality of the land is

therefore not good for the purpose. All the ground appears to be taken up.

The Rev. J. R. Errington says—

“The churchyard ought to be enlarged. It is quite inadequate for the interment of the dead.”

I was informed that an arrangement could be made with proper authority for adding some land on the north side of the churchyard.

At the Baptists' chapel there have been a few burials, but at that belonging to the Independents, none.

WATCHING, LIGHTING, AND GAS.—The town is not watched. There is a resident constable, and a lock-up. The General Watching and Lighting Act is in force so far as lighting is concerned, and there are five inspectors elected. Captain Holmes says in his evidence—

“There are 27 or 28 public lamps. The cost has been defrayed by a rate at 6*d.* in the pound. The town has not been long under the act, and heretofore there has been no proper arrangement. One will probably be made shortly. The lamps have been put out at 11 o'clock, and many nights they have not been lighted at all. Altogether the public lighting has been very unsatisfactory.”

William Wilson, Esq., says—

“There are gas works in Alfreton. They have been completed about two years. They are in the lower part of the town. The capital consists of 300 shares of 6*l.* each, paid up. No shares have been sold. The concern is registered under the Joint Stock Company's Act. There are about three retorts employed in winter, and one or two in summer. The price of gas is 8*s.* per thousand cubic feet, less from 5 to 10 per cent. discount, according to the quantity consumed. The gas concern is not in a very satisfactory state.”

OBJECTIONS TO THE APPLICATION OF THE ACT TO THE WHOLE PARISH.—Having been consulted by the promoters before the petition was signed, I am at liberty to say that the reason why the parish was included was, that as the town is placed at so great an altitude, comparatively, there might be greater scope in searching for a water-collecting ground. With this exception, the views of the promoters, and also the signatures, were confined to the township, and it was stated that, on any other conditions, the petition would never have been drawn up, nor would any of the inhabitants have affixed their names to it. At my first visit I found the feeling, without exception, to be against the inclusion of the whole parish within the district, and it was the existence of such feeling that had excluded the other parts of the parish from their minds, and led them only to affix the notices of the inquiry within the township.

The petition was, however, *prima facie* from the parish, and it was clearly my duty, according to the Public Health Act, and my instructions from your Honourable Board, to include the whole

parish in the inquiry. Having done so, it does not necessarily follow that the Act should include the parish. I therefore caused new notices to be issued, and commenced the investigation *de novo*; but I found, notwithstanding my explanation that the Board would decide disinterestedly for the good of the inhabitants at large, so great an opposition, that I do not think the Act would be worked out in a cordial spirit if applied to the whole parish.

Mr. Errington said that whatever others might think he was glad to see the inspector there. There was much difference of opinion in the parish, and in the more distant parts the inhabitants had not been consulted, and were much opposed.

James Oakes, Esq., J.P., said that the inhabitants of the Riddings District had been ignorant of the petition altogether, and he had a strong objection to that part of the parish being brought under the Act.

Gervase Cressy Hall, Esq., said that the improvements required by the Act within the township would put him to a great expense, but he should be glad to pay for his property. He thought, however, that the Act should not be applied to the remainder of the parish.

REMEDIES.

PUBLIC HEALTH ACT BENEFICIAL TO THE TOWNSHIP.—From what I have already stated the Board will be able to judge as to the present sanitary condition of Alfreton. The evidence given, and the result of my inspection, have, I think, established the facts—that there is a great excess of preventible disease and mortality, co-existent with the most deplorable destitution as to water, and the retention, in and about the houses, of a great portion of the animal and vegetable refuse of the inhabitants. Without recapitulating here, therefore, the other topics of my inquiry, there can be no doubt that the application of the Public Health Act, which proposes to remedy these physical defects, would be of great advantage to the town.

Taking into account, however, what I have just mentioned, as to the strong opposition to the inclusion of the whole parish, and its probable effect upon the future working of the Act; and also, the wide area over which the population is spread, and the consequent impossibility of extending to them the advantages of a water supply and systematic drainage, I am induced to recommend that the Act should only be applied to the township of Alfreton.

In pursuance of this opinion, formed after most careful consideration of all the circumstances, I have confined myself, in the consideration of remedial measures, to the township of Alfreton.

WATER SUPPLY.—Water is one of the first necessities of life.

All animated nature droops and decays if deprived of it. The social habits of mankind leading them to dwell in communities, always inhabiting the same spot of earth, render necessary arrangements for its preservation and distribution. It is the want of this, and of its proper discharge after contamination by use, that has mainly brought about the low sanitary condition of all the town populations in the country.

As a general rule, these defects are more observable in large towns than in small ones, because the noxious gases are more concentrated in the midst of a dense population; but where peculiar local circumstances tend to prevent the removal of existing filth, and the quality of the water is bad, it frequently happens that disease becomes epidemic, and rages fearfully amidst the population of a small town, that ought under better arrangements to enjoy a high state of health. The densely packed inhabitants of a large town, seldom breathing a pure air, become to some extent acclimated, while those of a small town fall an easy prey to a disease that has once assumed an epidemic form.

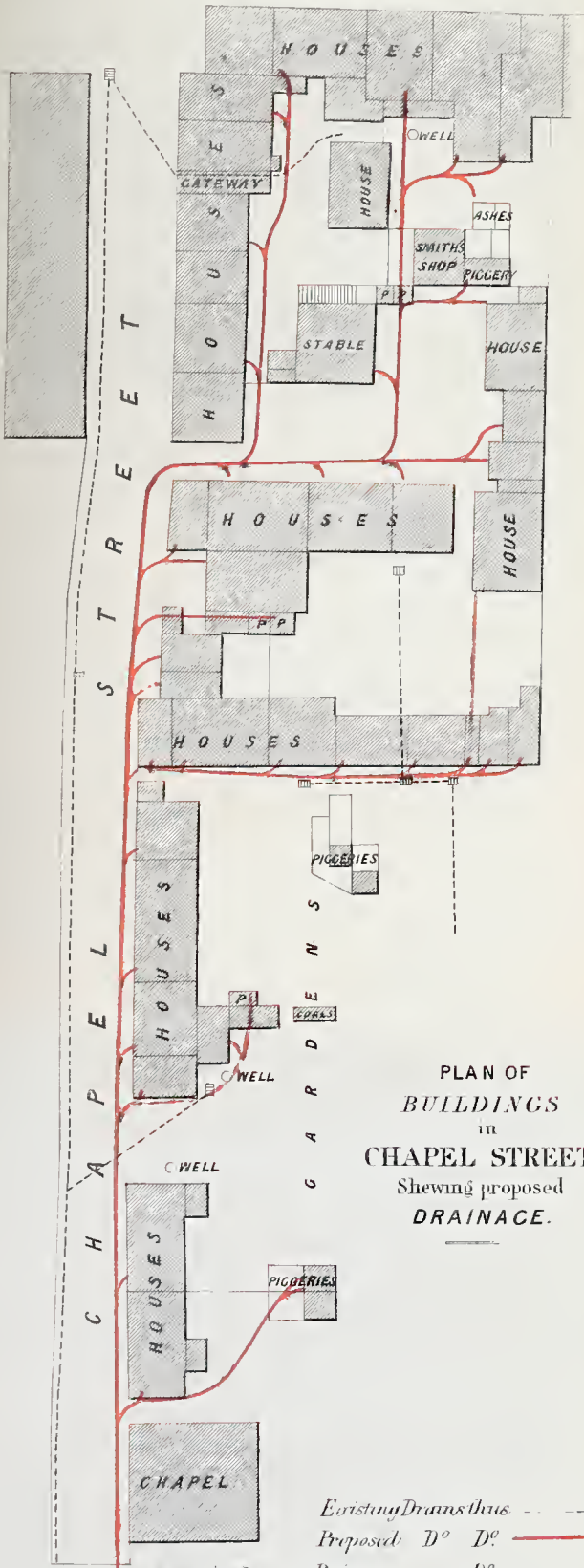
The peculiar defect, the characteristic evil of Alfreton, is the want of water, and the bad quality of that which the inhabitants obtain. The consequence is, that the people use as little as possible, and without an abundant use of water the refuse of the houses cannot be properly removed.

Water suitable for domestic purposes ought to be free, not only from animal and vegetable matter, but also from the solutions of iron, and to a great extent of lime. It ought to be abundant in quantity, so that the inhabitants can use it freely without any restraint. It should be accessible where it may be required, namely, in each house, and at each inlet of drainage; and it must be so cheap in cost that the payment shall not be felt as a burden by the poorest rate-payer. In devising the best mode of supplying the town of Alfreton with water, in accordance with the above conditions, I have experienced considerable difficulty, arising partly from the high altitude of the houses, as compared with the surrounding land, and partly from the absence of any surveys, levels, or sections whatever. In such a case the nicest accuracy is often of importance.

I would not have it supposed that there is any difficulty in supplying the town with pure water: the question is merely one as to the mode; where land-drainage water can be collected soon after it falls from the clouds, it is always more pure than either river or spring water, or any other that has been for some time in contact with the soil; and when such water can be collected at a higher level than the houses, so as to give the supply without steam or other mechanical power, it is always cheaper than where such power has to be used. I have been anxious, therefore, to provide for Alfreton a supply of land-drainage water acting by gravitation. The very limited area of collecting-ground required for the pur-

LFRETON.

NOTTINGHAM ROAD



PLAN OF BUILDINGS in CHAPEL STREET, Shewing proposed DRAINAGE.

Existing Drains thus ---
 Proposed D^o D^o ———
 Privies D^o P



pose will, I have little doubt, enable this to be done; but should any difficulty arise on careful sections being taken, I have provided an alternative, using the same kind of water at a lower level, so as to increase the collecting-ground, and adopting steam-power to pump the water into a service reservoir.

Coals and extensive iron-works exist upon the spot, so that at the worst, no place could be more advantageously situated as to the economy with which the works may be constructed. I have estimated 20 gallons of water per day for each individual; this will no doubt appear to the inhabitants, who have been accustomed to hoard water as a precious commodity, a large quantity; but it is no more than is actually used where water is supplied by public works, on the constant system, and I am satisfied that a less quantity would be too little. I have also provided for a population of 2,000, because it would be very short-sighted in constructing public works that ought to endure for many generations, to arrange only for the existing population, and to entail the certain expense of re-construction at no distant period.

I have taken the minimum annual rainfall at 32 inches, in a former part of this report, and if from this we deduct one-half for evaporation and absorption by the soil and vegetation, the rain falling upon 40 acres of land would yield a sufficient quantity of water when under-drained, to supply the whole town of Alfreton with the quantity I have stated for each individual. The quantity required would be 40,000 gallons per day, equal to 2,342,745 cubic feet per annum.

The highest land in the immediate vicinity is near the first milestone on the Nottingham road. As nearly as I could ascertain, the level there is a little above the parapet of the church, which is higher than any of the houses in the town. If a sufficient area be found there, such part of the land as has not been already drained would require it. These drains would empty into an earthenware pipe, which would convey it to a reservoir capable of containing at least three months' supply. From the reservoir iron pipes would conduct the water to the town, and distribute it, so that there should be a tap on the sink-stone of every house, and also fire-plugs or hydrants at convenient distances in the streets for washing and watering the roads, &c. The following would be an approximative estimate of the cost of constructing the works:—

ESTIMATE FOR WATER SUPPLY.

	£.	s.	d.
Land for reservoir	150	0	0
Catchwater drains and laying	140	0	0
Making store reservoir	250	0	0
Main and street pipes	666	5	0
Services, including tap in each house and to improved privy	350	0	0
Fire plugs	10	10	0
<hr/>			
Total	£1,566	15	0

One of the most equitable provisions of the Public Health Act is that by which money can be borrowed on security of the rates, for the construction of works, and repaid by equal annual instalments of principal and interest in a period not exceeding 30 years. This is particularly applicable to a place like Alfreton, where there are no public funds available for any such purposes. The clause in the Act is one that bears not only upon the water but upon all the other improvements that might be necessary in the town, so that if an owner of cottages required to have water-pipes and drains laid into them, he would only be charged a few shillings each per annum for that time, instead of having to pay down the whole sum at once. The provision is also one that will prevent injustice being done to persons having only life estates, or limited incomes arising out of house property, and mortgages in possession. The improvements effected would be permanent additions to the value of the property, and as such it would be unfair in all instances to charge the whole upon the persons at present in possession. The manner in which this would affect the water supply to Alfreton would be, that if the whole amount were borrowed, the annual instalment of principal and interest, to repay it in 30 years, would be 92*l.* 14*s.* 3¼*d.*, at the end of which time the water could be supplied almost gratuitously. If 350 houses were supplied, this would only amount to *one penny farthing each per week*, but as it would not be right to charge the cottages at the same rate as the larger houses, a very little increase upon the latter would enable the poor to have a constant supply of water at a price not exceeding one penny per week per house. If, however, any difficulty should arise as to the levels, so as to prevent the whole town from being supplied by gravitation, the land already pointed out would be sufficiently elevated for fully one-half, and I should then construct a small reservoir at a lower level, as near as convenient to Pipe's houses, and pump up that portion of the supply to the top of the hill by means of a steam-engine. The power required would only be equal to half a horse working 12 hours per day, and I think that an arrangement would easily be made with W. P. Morewood, Esq., to raise the water by means of his colliery engines there, so that it would not be necessary to incur the expense of an attendant, whose wages would be constant. -

Under such a contingency, the estimate would require the following additions:—

	£	s.	d.
Estimate by gravitation, as before	1,566	15	0
Small reservoir near, pipes, houses, and land	150	0	0
Iron pipe to service reservoir	181	10	0
	<hr/>		
	1,898	5	0
Rent of engine power	25	0	0
	<hr/>		
	£1,923	5	0

On the same principle of distribution over a term of years, the annual instalment to repay 1,898*l.* 5*s.* would be 112*l.*; to which must be added 25*l.* annual for engine rent, making 136*l.*,—equal to an even house charge of *one penny three farthings* per week; and if all the larger houses, say those above 10*l.*, were charged twopence each, I have no doubt that the poor might still be supplied at not exceeding *one penny*. It will be observed that no credit is taken for water to stables, inns, and manufacturing purposes.

DRAINAGE OF THE TOWN.—The inclination of the town is so favourable for perfect drainage, that, having obtained a proper supply of water, the works would be of the most economical construction. I should bring up from the lower part of the town an earthenware pipe 8 or 9 inches in diameter, and at the market-place branch along the three roads at the top of the town with pipes of about 6 inches diameter, and into these, as main drains, convey pipes of 3 or 4 inches from all the houses, sink-stones, courts, roof-pipes, and privies, so as to pass into underground channels, immediately, everything that could be so removed, and that might become offensive and injurious if allowed to remain in the houses, or on the surface. Every opening in these drain-pipes should be trapped.

It is quite unnecessary to provide for all the rain-water that falls upon the surface of the town, because it can do no harm, and may flow along the surface channels as heretofore. The sizes of pipes I have named will appear small, but it must be remembered that they will have to convey little more than the pipe-water supplied to the houses, and the refuse mixed with it, except the rain-water of the roofs and courts. It has been found by practical experiment that pipes of the sizes I have named will be large enough for twice the number of houses, if a constant supply of water be given.

I should continue the main drain for some distance below the town, so as to prevent any effluvia from being perceived by the inhabitants. The construction of such a system of drainage would probably cost about the following sums:—

ESTIMATE FOR DRAINAGE.

	£.	s.	d.
Street drains and laying	666	10	0
House, court, and privy drains, including soil-pan apparatus to privies	612	10	0
Conveying drain below the town to parish boundary	203	10	0
	<hr/>		
	£1,482	10	0

The annual instalment to repay this would amount to 87*l.* 14*s.* 2½*d.*, which would be equal to *one penny and an eighth per week per house*. It may safely, therefore, be said that the

drainage would not cost *one* penny per week each for the cottage houses.

AGRICULTURAL AND SUB-SOIL DRAINAGE.—As to the advantages of land drainage, I refer to the evidence of Mr. Wilson. It cannot be otherwise than that heavy clay land, such as that at Alfreton, should be greatly increased in fertility by drainage. I need only, therefore, add here that the occupiers of land in the district would have the privilege of having their land drained, with all the assistance that could be rendered them by the local Board of Health, and also by the General Board, and of repaying the cost by annual instalments in the manner already described. The effect of this would be, that if the drainage of land should cost, say 5*l.* per acre, the farmer would have to pay annually about 6*s.* per acre as a private improvement rate; and if he should be removed from his farm before the expiration of the 30 years, his successor, who would derive the future benefit, must pay the remaining instalments.

SEWAGE DISTRIBUTION.—Liquid manure has not been extensively used in Alfreton. Mr. Wilson has used it for pasture, and approves of it. The solid refuse of the town was formerly detained, but the most fertilizing properties would undoubtedly escape in suspension and solution. Manure has to be dissolved before it can be taken up and assimilated by plants, and in all cases a large proportion of the solid manure applied passes off by evaporation, pollutes the air, and is thus worse than wasted; while, if applied in a liquid form, it would have been at once digested. The immense increase in crops where it has been systematically applied is the best proof of its efficacy; and though we may not expect that land in Alfreton shall be increased in annual value to 30*l.* or 40*l.* per acre, or that pasture will yield 100 tons of green food per acre in a year, yet it is not the less true that these marvellous results have been produced, and are now continued in this country, simply by the use of liquid town manure. We have a right, therefore, to expect that its application would be attended with very beneficial results, and I have no doubt that the whole of that produced by the town of Alfreton could be used with facility upon the land below the town, and so as ultimately to yield a considerable income to the public funds. It is an article that is essentially public property; and while it ought not, for want of removal, to injure the health and lives of the people, it ought not, on the other hand, to be wasted when its intrinsic value is so great.

IMPROVED PAVING AND CLEANSING.—I have already stated that the principal carriage-ways in the town are repaired by turnpike trustees. There are some minor roads, however, that are not repaired at all. The public footways are capable of improvement both as to character and cost; and there are many courts that would be much improved by the adoption of cheap impervious pavement.

For this purpose I would recommend gas concrete, such as is used in Nottingham and other towns. It can be laid down at less than one shilling per square yard, and would keep quite clean, and last for many years. If we were to reckon the large quantity of 20 yards to each house, the distributed charge would not amount to one halfpenny per week per house. With an abundant supply of water and a system of underground drains, and also with cheap, durable, and impervious pavement, the whole surface of the town could be washed and made perfectly clean, at frequent intervals, by the use of the hose-pipe and jets of water, at a cost not exceeding one halfpenny per week per house.

THE BURIAL-GROUNDS.—I think that the health of the town, and the feelings of mourners, require that the churchyard should be adequately enlarged, and that the old parish burial-ground should be closed, except under necessary restrictions. No further interments should be permitted in the very confined ground attached to the Baptist chapel.

CONCLUSIONS AND RECOMMENDATIONS.

The following conclusions and recommendations include substantially, upon a review of the whole subject, what I feel it my duty to lay before your honourable Board for consideration.

I. That the town of Alfreton has, at former periods, been visited with epidemic fever; but that during the latter part of the past and the early part of the present year, typhoid fever has raged with fearful effect among the inhabitants.

II. That the position, the physical contour, and climate of Alfreton is naturally healthy.

III. That there are no works or public arrangements having reference to health, but that the means of obtaining water, and its quality when obtained, are defective in the extreme.

IV. That there exist, in the accumulations of fæcal matter, and other offensive substances, and in the condition of open ditches containing decomposing town refuse, abundant causes of the fever that has been so prevalent.

V. That such fever is indigenous in its origin, and that there exists no reasonable ground for the statement that it was imported from the West Indies.

VI. That if any epidemic disease should be brought into the town in its present defective sanitary condition, such disease could scarcely find a more suitable abode.

VIII. That the health of the inhabitants would be greatly improved by—

a. A supply of good water, with a tap in every house, constantly on under pressure.

b. An efficient system of drainage of the site of the town,

including the courts, houses, and other buildings, and the substitution of water-closets or soil-pan apparatus, with proper drains, for the present privies.

c. Improved paving of courts, alleys, and public footways.

d. Improved systematic watering and cleansing of the courts and streets.

VIII. That the above objects may probably be effected at the following rates per week, for each cottage house :—

a. A constant supply of pure water in each house, *at one penny.*

b. A system of complete drainage, with soil-pan apparatus, in lieu of the present privy, *at one penny.*

c. Clean, durable, and impervious paving of courts, &c., *at one halfpenny.*

d. Public cleansing of the whole surface of the town with hose and jets of water, *at one halfpenny.*

IX. That the whole of the weekly payments for the above objects will be less than the present average cost of a small supply of indifferent water, taking into account the time occupied in fetching and carrying, &c.

X. That the low lodging-houses exercise an injurious influence upon the town, and ought to be placed under proper regulations.

XI. That the parish burial-ground is unfit for the reception of the dead, and ought to be enlarged.

XII. That the sewage manure may be applied to the agricultural land with great advantage, and so as to produce a considerable revenue to the town.

XIII. That there is no local Act of Parliament in force having any relation to the provisions of the Public Health Act.

XIV. That considering the scattered condition of the inhabitants of the remote parts of the parish; the universal opposition to the inclusion of such parts within the district; and the probability that such inclusion would prejudice the efficient operation of the Act, it would be better not to apply the Act to the whole parish.

WHEREUPON I RECOMMEND—

1. That the Public Health Act (1848), except the section numbered 50 in the copies of that Act printed by Her Majesty's printers, be applied to the *township* of Alfreton, within the parish of Alfreton, in the county of Derby.

2. That the local Board of Health to be elected under the Public Health Act shall consist of *nine* persons, and that the entire number shall be elected for the whole of the said district.

3. That the first election of the said local Board of Health shall take place on the 25th day of March, in the year of our Lord 1851.

4. That one-third of the number of the said local Board shall go out of office on the 25th day of March in each year, subsequent to that in which the said first election takes place.

5. That every person shall, at the time of his election as a member of the said local Board, and so long as he shall continue in office by virtue of such election, be resident, as in the said Public Health Act (1848) is required, and shall be seized and possessed of real or personal estate, or both, to the value or amount of not less than 500*l.*; or shall be so resident and rated to the relief of the poor of the said township, upon an annual value of not less than 20*l.*

I have the honor to be,

My Lords and Gentlemen,

Your very obedient Servant,

WILLIAM LEE,
Superintending Inspector.

To the General Board of Health,
§c. §c. §c.

APPENDIX.

Alfreton, 27th November 1849.

MY DEAR SIR,

I HAVE much pleasure in complying with your request, by writing a few observations on the *nature, symptoms, and causes* of the fever which has prevailed in the town and neighbourhood of Alfreton, to which I have also added the *TREATMENT*, as, in my opinion, tending in some measure to elucidate the character of the disease.

Believe me, my dear Sir,
Very faithfully yours,

GEORGE OLDHAM.

To the Rev. J. R. Errington.

NATURE.—I am not aware that the type of the fever prevailing in Alfreton and the neighbourhood has differed in any way from the fever which has prevailed in the district from time to time, for some years. The only important distinction has been in its extent. The character of the disease has been that of continued fever passing, in many cases, into typhus of a bad type. I have had many opportunities of treating and observing the character of the fevers of the district for some years, and I must confess they differ very materially from the cases which occurred 15 or 20 years ago, during my apprenticeship, and the early part of my practice here; the difference consists in—

1. The organs most seriously and dangerously affected.
2. In the treatment; the antiphlogistic remedies not required to be so powerful, or persevered with so long.
3. The vital powers are reduced, and consequently require to be supported much earlier than they were accustomed to formerly.
4. In the termination of the fatal cases (*i. e.* in the mode of dying), formerly this took place most frequently from coma; in the present, and fever of late years, from the consequences of bronchitis, or from exhaustion; the consequence of hæmorrhage from the mucous membrane of the bowels; or from protracted diarrhœa, in consequence of a softened or ulcerated condition of the same membrane.

When the disease first, in August last, made its appearance in the town, it attacked many of the middle class and more respectable of the inhabitants, and in those parts of the place considered the most healthy. The first day I was called upon to see a case, I visited not less than six others; and in three days afterwards the cases under my immediate care amounted to twelve or fourteen. These cases, at the onset, presented no peculiarities different from the symptoms which usually usher in continued fever.

SYMPTOMS.—A general sense of feebleness and fatigue, upon the slightest exertion of body or mind; pain in the head, particularly across the forehead; pain in the back and limbs; frequent chills, sometimes a distinct shivering fit; the bowels were irregular—sometimes con-

fined, at others there was diarrhœa; the tongue generally loaded, and in many cases tremulous; there was thirst, and the senses were more or less blunted; the countenance, at first, generally pale and anxious, and, as the disease advanced, relaxed, and sometimes of a dusky hue; pulse usually quick, and in most cases feeble; in others there was a degree of fulness, and in a few cases, as the disease advanced, there was observable, over the surface, small rose-coloured and purple spots about the size of flea bites.

The milder cases, where the symptoms were for the most part referrible to the head, with appropriate treatment, subsided in seven or fourteen days, without any remarkable occurrence, and convalescence gradually returned. In other cases, particularly where diarrhœa appeared early, the epigastrium, and, not unfrequently, the region of the cœcum, have been tender, not always observed by the patient, but readily discovered when pressure was made on the part; in these cases the tongue has usually been red, the papillæ much enlarged, and its centre generally covered with a yellowish or dark-brown fur; as the disease advanced the furred part has become dry and cracked, so that the organ could be protruded by the patient with difficulty; in others the fur has disappeared, and the tongue has presented much the appearance of a piece of raw or uncooked meat. In these cases the pulse was invariably quick and often irregular; the countenance, in some cases, anxious, more frequently, relaxed; the senses and sensibilities much blunted. In some cases the patient could not be roused unless spoken to sharply, and this state was often accompanied by deafness. In these cases, as I stated before, there was diarrhœa, the stools generally offensive and of a yellow colour, not unlike pea-soup; in some the evacuations were tinged with blood, and contained much mucous; in others there was extensive and alarming hæmorrhage from the mucous membrane.

In another class of cases the symptoms as the disease advanced were those of bronchitis in its various stages, and in some cases the bronchial symptoms appeared to alternate with those of muco-enteritis before described; not infrequently in the muco-enteritis and bronchial cases there was muttering delirium, and in some cases the evacuations were passed involuntarily and unconsciously.

The treatment I have usually adopted has in no way differed from that practised in the fevers of this district for some time. I have enjoined perfect quiet of body and mind, abstinence from all solids and from fermented drinks, allowed toast-water and water-gruel or barley-water. I have generally taken the precaution to have the greater portion of the hair removed, and, in some cases, have ordered the head to be shaved. The symptoms referrible to the head appear to have been of a nervous character, and have usually subsided with the general treatment. As the disease advanced, if the pain in the head continued, or there was delirium or giddiness, I have applied a blister to the nape of the neck. I have cleared the bowels early with a mercurial purgative, and given as a febrifuge the liq. ammon. acet.; purgatives have afterwards been administered with caution. I have enjoined frequent spongings of the surface with hot or cold water, as most agreeable to the patient, followed by friction with a rough napkin.

When the epigastrium or cæcal region was unusually tender, I have frequently leeches early, followed by fomentations and poultices; and in many instances I have had recourse to counter irritants, such as blistering tissue, and the hot spirit of turpentine.

When the diarrhœa was persistent I have occasionally prescribed the hyd. c. creta, in conjunction with Dover's powders, in other cases creta was added to the liq. ammon. acet. mixture; when these have not sufficed to check the diarrhœa, tincture of opium and catechu have also been added to the mixture. I have also, when practicable, ordered enemata composed of starch and laudanum, and repeated as often as necessary with the happiest effects. When hæmorrhage has taken place from the mucous membrane, I have found the spirit of turpentine, in doses of about 15 *min.*, by far the most efficacious remedy, given as an emulsion with mucilage and a few drops of liq. potasse. As the disease advanced, ammonia has been added gradually and cautiously to the liq. ammon. acet. mixture, also nitrous æther; and when there were tremors or watchfulness, tincture of opium in doses of 5 *min.* repeated at intervals of four hours. When bronchial symptoms have made their appearance, they have been combated by leeching, succeeded by counter irritation. The powers have required to be sustained early with light farinaceous food, such as sago, arrow-root, and tapioca; also with animal broths in some cases with wine, and others even brandy, which, of course, has been used cautiously, frequently visiting the patient to watch the effects of agents so powerful and uncertain. These have been increased or diminished in quantity according to circumstances, as the patient has steadily approached convalescence; jellies have been added cautiously, advancing to meats, such as game, mutton, or chicken. The tonics administered have been mineral acids and Bullock's amorphous quinine, and in the bronchial cases senega with ammonia.

The only peculiarity in the *treatment* of this fever, like those prevailing in this neighbourhood for some years, has been to avoid too great reduction of the vital powers, and to give nutriment and even stimulants much earlier than we were accustomed to do some years ago.

The diseases within the cranium have not required much activity of treatment, death not having taken place in a single instance under my observation from coma.

The diseases referrible to the abdomen and thorax have required the greatest possible caution and discrimination.

I have had, during the prevalence of the epidemic, nearly 70 cases in the town, and upwards of 90 in the country villages. Out of this number I have had hitherto five deaths, one in the town and four in the country:—

One from exhaustion, the consequence of hæmorrhage.

One from exhaustion, the consequence of long-continued diarrhœa; the termination hastened by inability to swallow.

One from exhaustion, the consequence of extensive sloughing sores combined with inefficient nursing.

Two from *bronchitis*, both women, who had previously been reduced by over-lactation.

THE CAUSES.—The causes of fever is evidently a poison introduced

into the system. This poison has, in my opinion, been engendered in two ways:—

1st. From poisonous malaria existing in the atmosphere at the time generally, and more particularly generated by the decomposition of vegetable and animal matter in the immediate locality.

2nd. From the effluvia escaping from the bodies of those affected with the worst forms of the disease, constituting it essentially a contagious malady.

Query. Are the atmospheric causes of this fever and cholera identical, the type assumed by the disease being dependent on local causes, such as malaria or offensive effluvia existing in the atmosphere of the place, arising from inefficient drainage, the decomposition of vegetable and animal matters in the uncovered ditches and privies of the place, these being numerous and exposed to the influence of both sun and air? The *vis vitæ* of the people, being reduced by the inhalation of the effluvia from these sources, rendering them more susceptible of impressions; the place withal being badly supplied with water, and that of an impure character, highly charged with salts of iron. We have enjoyed perfect immunity from cholera.

I am fully aware the cause of this epidemic has been ascribed by many, and medical men among the number, to importation from Demerara. I am not myself disposed to attribute the disease to any such cause, the nature of which, to my mind, is so evident, and its causes tolerably well understood, nor do I wish to please the minds of the dealers in this wonderful theory by giving any such ridiculous or unfounded opinion, I will give a short history of this importation.

The young man who came from Demerara to the town was attacked in that country with (I am informed) yellow fever; he was ordered by his medical attendant there to his own country. He was accordingly sent by a sailing vessel, being five weeks on his passage to Liverpool; he was there taken to a friend's house, where he remained a fortnight, and at the end of that time was brought home (to Alfreton) by rail. When he arrived here I was called upon to visit him; he was suffering from great debility, had a large wound over the sacrum, from which a slough had separated a few days previously, and he had a regular shivering, followed by the usual hot and sweating stages of intermittent every third day.

These symptoms quickly gave way to large and repeated doses of quinine, the wound healed satisfactorily, and he quickly recovered. Not a single person on board the vessel, or at his friend's house in Liverpool, was affected with the disease.

Several persons who assisted him out of the carriage, and attended upon him, have been afflicted with the epidemic here, and two or three have fallen victims.

The epidemic here, however, did not commence for eight weeks after his arrival. My reasons for considering the Demerara theory unfounded and untenable are:—

1. Supposing the parties exposed to his influence imbibed or inhaled a poisonous effluvia from his body, this must have re-

mained eight weeks in the system without producing any sensible effect; a proposition, I should say, the most monstrous *ever advanced*.

2. Many of the inhabitants of the town who had never been exposed to [his influence began sooner, and others as soon as those who had suffered such exposure.

3. Not one out of the whole number of those affected has assumed the same type of disease as the young man who came from Demerara.

4. The disease has been in every particular similar in its symptoms, its course, and termination to the fevers which have prevailed in this neighbourhood for some years, differing, as I stated before, only in the number attacked, and the early reduction of the vital powers, which, as far as I have had opportunities of judging always, takes place where disease prevails epidemically as compared with sporadic cases.

G. OLDHAM.

*Henrietta-street, Cavendish-square,
24th December 1849.*

DEAR SIR,

IN Mr. Oldham's clear and full account of the fever which has recently been prevalent at Alfreton, I recognise distinctly the same disease, having exactly the same features, that I have been familiar with in London from time to time during the last 12 or 15 years. By the same features, I mean not only the same group of symptoms, but especially the early debility, and the consequent necessity for avoiding as much as possible blood-letting, and other lowering remedies, and for giving support in the early stages of the disorder. The disposition to ulceration of the bowels, and to hæmorrhage therefrom, the comparative freedom from serious affections of the head, and the tendency to death by asthenia or exhaustion. When I first studied and practised in London, the common type of continued fever bore and required more active depletion in the outset, was characterized by more decided head symptoms, and the tendency to death mostly in the way of coma.

I cannot doubt that the disease which has been epidemic in Alfreton was the ordinary continued fever of this country, propagating itself by contagion and running its usual course.

The mortality among Mr. Oldham's patients, 1 in 32, was very small.

That such fevers are contagious, my own observation, which has not been scanty, and much and diligent inquiry into the subject, have thoroughly convinced me; still, having been for many years a hospital physician, and for a still longer time a frequenter of hospitals, I well know from experience that this contagious property is but faintly manifested where ventilation and cleanliness can be ensured and made complete. It is notorious that these fevers, like the cholera, spread rapidly, and exhibit a bad type in proportion as they occur in connexion with impurities in the atmosphere. The way to check their extension and to prevent their recurrence, is to take care that all ill smells and other tokens of foul air be got rid of by the free ventilation and purification of houses, by thorough drainage, and by covering

over all ditches and other receptacles of filth, by the effluvia arising from which the air of the place might be poisoned.

There are, I believe (for on this point I have no personal experience), two forms of yellow fever, of which one is produced solely by marsh miasmata, and is of the same nature as severe and intense intermittent fever.

Whatever may be the case with respect to the other form of yellow fever, I should very much doubt whether this *form* is ever capable of being disseminated by contagion, and this was apparently the form of yellow fever under which the stranger from Demerara had been suffering. I judge from the intermittent type which it assumed in this country, and from the ready and rapid recovery which took place on the administration of quinine; taking further into account the length of time which elapsed between his leaving Demerara (when in all probability the disease was past its worst, or he could scarcely have undertaken the voyage), and the outbreak of the epidemic at Alfreton, a period of about 15 weeks, the dissimilarity of his disease and that which befel the inhabitants of Alfreton, the immunity of all who had intercourse with him on board ship and at Liverpool, when the contagion, if his complaint were contagious at all, must have been stronger than afterwards, the fact stated by Mr. Oldham that persons in Alfreton who had no communication with the sick man from Demerara fell ill of the fever before others did so who had such intercourse; taking, I say, all these circumstances into consideration, I cannot hesitate, so far as my humble judgment may avail, to acquit the returner from Demerara of all share in the causes which led to the prevalence of fever in Alfreton.

I remain, dear Sir,

Very faithfully yours,

The Rev. J. R. Errington.

(Signed) THOS. WATSON.

MY DEAR SIR,

20, Dover-street, 24th January 1850.

I HAVE considered Mr. Oldham's Report on the fever which has lately prevailed at Alfreton and its neighbourhood, and have no doubt that this fever is a form of the continued fever of this country (variously called *continued*, or typhoid, or typhus fever), which has of late years occasionally prevailed epidemically in London and in various parts of the country, and consequently that it was not imported from Demerara.

The account Mr. Oldham gives of the symptoms and course of the disease agrees entirely with what I have observed of the symptoms and course of the continued fever that has lately prevailed in London.

I believe that this fever is *infectious*, propagated, *i. e.*, directly or indirectly, by means of emanations from the bodies of persons already ill of it.

1. Infection may take place through the air in the sick chamber. This, however, seldom happens unless the chamber be ill-ventilated, or close, or crowded, or unless the practices of cleanliness, to which I shall presently allude, are neglected.

2. By means of the bed-clothes, when these are allowed to become dirty, and thoroughly impregnated with the emanations from the body in fever.

3rdly and chiefly, by means of the intestinal discharges from the sick.

The intestinal discharges, if allowed to remain in the sick chamber, or if thrown into open privies or uncovered drains in the neighbourhood of houses, taint the air that is breathed and propagate the disease.

The means best calculated to prevent the spread of the disease are—

1. To prevent crowding of the sick chamber, and keep it well supplied with fresh air.

2. To keep the person of the patient and his bed and body linen as clean as possible.

3. To remove speedily from the house the intestinal discharges of the sick.

4. Thoroughly to air and cleanse the room and the bed-clothes on the recovery of the patient.

5. To cover all drains that receive the contents of privies, and, where possible, to convert open privies into water-closets.

6. To procure a liberal supply of water, which is necessary for cleanliness, and also to carry infectious matters through the sewers away from the immediate vicinity of the houses. For this purpose water is not materially the worse for being impregnated with iron.

A free supply of water, and the general adoption of water-closets and covered sewers will, I believe, tend more than any other measures to prevent the spread of fever, by giving the means of cleanliness, and by carrying away from human habitations the infectious matter that is thrown off from the bodies of persons ill of fever.

Believe me, my dear Sir,

Yours sincerely,

To the Rev. J. R. Errington.

G. BUDD.